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Bagworm

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CURRENT SERIAL RECORDS

The bagworm (*Thyridopteryx ephemeraeformis* (Haw.)) is sometimes called the evergreen bagworm. It is a native insect and occurs throughout Eastern United States from Vermont to Florida and west to Texas and the Great Plains (fig. 1). Primarily a pest of trees and shrubs on city and town streets, parks, and private grounds, it is of little or no economic importance as a pest of forest trees. However, large populations have been reported in stands of eastern and southern redcedar and Atlantic white-cedar and in many black lo-

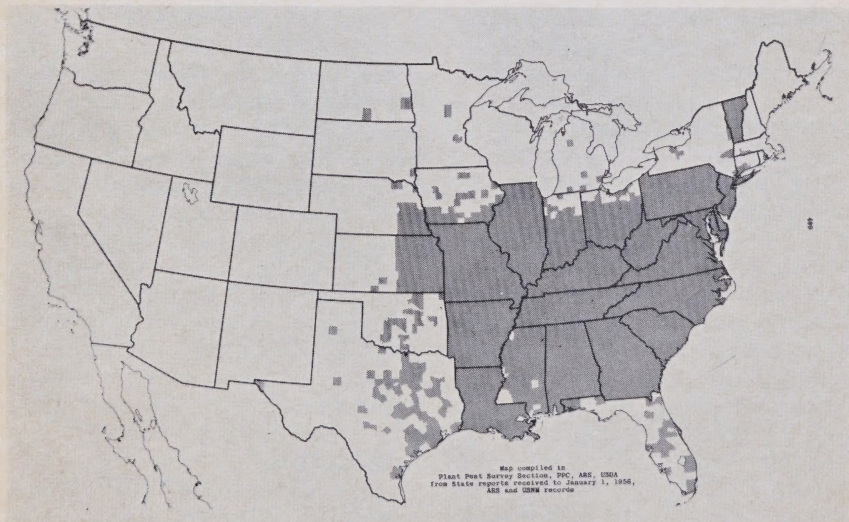
cust strip-mine reclamation plantings in Illinois, Kentucky, and Ohio.

Several other bagworm species occur, principally in the South and Southeast. One of these, Abbot's bagworm (*Oiketicus abboti* Grt.), occurring in Florida, can be distinguished by the construction of the bag: Abbot's bagworm covers its bag with small, horizontally placed twigs as well as leaf fragments whereas the evergreen bagworm generally uses leaf fragments alone.

Host Tree

Thyridopteryx ephemeraeformis feeds on a wide variety of trees, chiefly conifers, including arbovitae (a highly susceptible host),

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Figure 1.—Distribution of bagworm (*Thyridopteryx ephemeraeformis* (Haw.)). (Map by Plant Pest Survey Section, Agricultural Research Service.)



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Figure 2.—After larval feeding is completed, bagworm cases are seen firmly attached to infested plants.

maple, boxelder, sycamore, willow, black locust, various species of cedars, juniper, elm, linden, poplars, oak, apple, cypress, spruce, wild cherry, sassafras, and persimmon.

Evidence of Infestation

Young bagworm larvae are inconspicuous, and early stages of infestation are not very noticeable. The most conspicuous evidence is sudden defoliation of tree tops and many bags firmly attached to twigs and leaves where larvae are feeding (fig. 2). These bags differ in appearance according to host plant (fig. 3). Bags of very young larvae are not only small but are upright and conical. Bags of full-grown larvae are from $1\frac{3}{4}$ to 2 inches long and $\frac{1}{2}$ inch wide through the widest diameter. Being topheavy, the large bags hang downward.

Economic Importance

Bagworm is of most concern when it attacks ornamental shrubs. Many arborvitae and juniper die after it completely defoliates them. Less severe attacks retard growth. Twig dying has been attributed to the tight silken band around the twig with which the larva attaches the bag. Bagworm becomes exceedingly abundant every few years, and may then be found on shade, orchard, and forest trees of nearly every kind. In such years bagworm draws more attention than any other defoliator.

Description

Fabre described the newly hatched larva as $\frac{1}{25}$ inch long, head and upper part glossy black, the next two segments brownish, and



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Figure 3.—Bags differ in appearance according to host plant foliage used to make them. These were taken from arborvitae, pine, and black locust.

the remainder of the body pale amber. On hatching, the larva almost immediately begins to spin its bag which is first observed as a garland of pellets on a silken thread around the larval body behind the legs (fig. 4). Leaf and twig fragments are added to form a bag eventually about 2 inches long and $\frac{1}{2}$ inch in diameter.

The adult female is wingless, grublike, and has minute, useless legs. The male is a small, hairy-bodied moth with clear wings (fig. 5).

The eggs are yellow, spherical, and about $\frac{1}{32}$ inch in diameter.

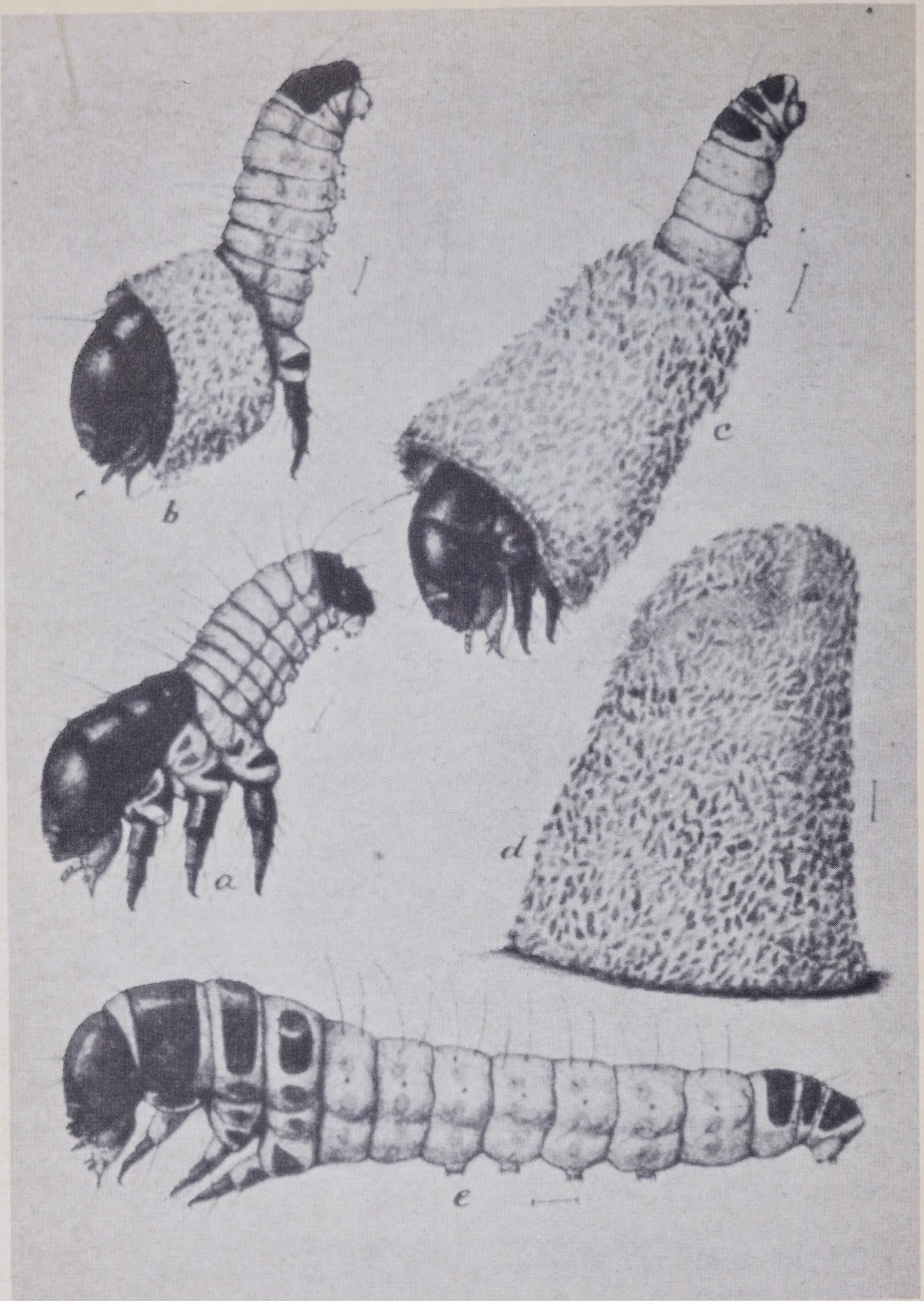
Life History and Habits

Bagworm overwinters in the egg stage inside the tough, silk-lined female bags fastened to twigs. Eggs

hatch during May or June, the time varying somewhat with geographical location and seasonal weather fluctuations. The time the larvae mature varies with location and somewhat with type of host plant. In Ohio and the Washington, D.C., vicinity, this is generally in late August.

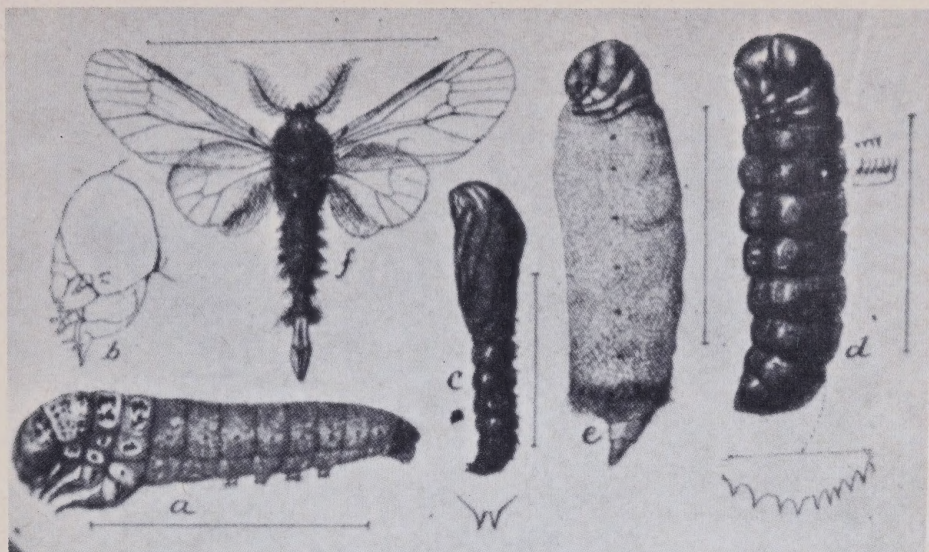
In September or October adult males emerge from their bags and begin their mating flight in search of the wingless females. The female remains inside her bag and mating takes place at the bag entrance. The bag also contains the empty pupal case from which the female emerged. After mating, she lays her eggs in this case where they remain over winter (fig. 6).

The wide distribution of the evergreen bagworm can be explained despite the female's lack of wings.



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Figure 4.—A, Newly hatched bagworm before making its case; B, same, just beginning case, C, same, with its case nearly completed; D, completed case, insect concealed within; E, larva after first molt. Highly magnified. (From Howard and Chittenden.)



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Figure 5.—Bagworm (*Thyridopteryx ephemeraeformis*): A, Full-grown larva; B, head of same; C, male pupa; D, female pupa; E, adult female; F, adult male. All somewhat enlarged. (From Howard and Chittenden.)

Import of plants with undetected infestation is believed to account for the recent appearance of three old-world species of bagworm in widely different places in America. Wind dispersal is possible over short distances. Young larvae are especially adapted for air transport because they spin long silken threads that make them buoyant. Adaptations aiding survival include ability to go without food for long periods, acceptance of many different plants for food, use of any support for the necessary attachment of the bag for pupation, and production of many eggs by a single female.

Natural Control

Bagworm population varies widely from year to year. Outbreaks in Missouri subsided as natural enemies gained the upper hand. Neiswander mentions internal parasites as primary control agents in Ohio, with low winter temperature and bird predation on young larvae contributing. Three wasplike parasites commonly attack

the bagworm and are largely responsible for the briefness of outbreaks.

Control

On small lawn trees and other landscape plantings, a simple method of control is to pick off and burn the overwintering bags. If the bags are not destroyed but merely discarded on the ground, eggs will hatch in spring and larvae may crawl back on trees.

When numerous, bagworm may be controlled with a malathion spray of 1 quart 57-percent emulsion concentrate in 100 gallons of water (2 teaspoonfuls per gallon). This is effective against larvae in all stages and was as effective in early August as dieldrin. Malathion is preferred for general use because it is relatively safe and kills bagworms even after they stop feeding. Malathion spray applied August 2 in Ohio gave 95 percent control. The bagworms had stopped feeding at this date and kill was attributed to penetration of spray into the bag.



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Figure 6.—A, B, C, Bagworm at successive stages of growth; C, male bag; D, female bag. About natural size. (From Howard and Chittenden.)

Another chemical control that is effective on young larvae is a lead arsenate spray of 4 pounds in 100 gallons of water (9 teaspoonfuls per gallon). Application early in June is generally recommended because this spray is less effective on the larger bagworms found in July and August.

Some other recently developed chemical insecticides are also effective. A dieldrin spray of 2 pounds 50-percent wettable powder in 100 gallons of water gave better than 90-percent control when applied in Ohio in late July.

Caution: Use insecticides with care. A chemical used to kill in-

sects can be poisonous to man, animals, birds, and fish. Follow all directions exactly and heed all precautions on the labels. Keep insecticides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food and out of reach of children and animals.

Keep insecticides off the skin and out of the eyes, nose, and mouth. If the chemical is spilled on the skin, wash it off immediately with soap and water and remove contaminated clothing. If it gets in the eyes, rinse them with water for 15 minutes and get medical attention. Wear rubber gloves when measuring and ap-

plying liquid insecticides.

Avoid inhaling insecticide dust or spray mist. After handling or using insecticides wash the hands and face, especially before eating or smoking. Rinse the equipment after use, destroy empty containers, and store excess chemical safely.

Do not spray on windy days. Apply properly diluted chemicals as coarse sprays under low pressure. Avoid drifting of insecticide spray. Avoid forming puddles on the ground where birds or animals might drink. Keep children and animals away when spraying.

To protect fish and wildlife, be careful not to contaminate streams or ponds with insecticides. Do not clean spray equipment or dump excess spray material near such water.

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